

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended): A nonaqueous electrolyte, comprising:

a nonaqueous solvent containing ethylene carbonate (EC), γ -butyrolactone (BL), and at least one ~~third solvent~~ selected from the group consisting of ethylene sulfite, phenylethylene carbonate, 2-methylfuran, furan, thiophene, catechol carbonate and vinylene carbonate as a third solvent, the EC content falling within a range of 20 to 50% by volume based on the total amount of the EC and the BL, and the BL content falling within a range of 40 to 80% by volume based on the total amount of the EC and the BL; and a solute dissolved in said nonaqueous solvent.

Claim 2 (Currently Amended): A nonaqueous electrolyte secondary battery,
comprising:

a case having a wall thickness not larger than 0.3 mm;
a positive electrode provided in said case;
a negative electrode provided in said case; and
a nonaqueous electrolyte provided in said case and comprising a nonaqueous solvent
containing ~~ethylene carbonate (EC) and γ -butyrolactone (BL)~~ and a solute dissolved in said
nonaqueous solvent, the nonaqueous solvent containing ethylene carbonate (EC), γ -
butyrolactone (BL), and at least one selected from the group consisting of ethylene sulfite,
phenylethylene carbonate, 2-methylfuran, furan, thiophene, catechol carbonate, and
vinylethylene carbonate, as a third solvent,

wherein, when a charge-discharge cycle test satisfying conditions (A) to (D) given
below is performed under an environment of 45°C, the capacity retention rate at a 100-th
charge-discharge cycle is at least 85% based on the discharge capacity in the first charge-
discharge cycle:

(A) for the charging, the constant current-constant voltage charging to 4.2V is
performed for 3 hours under a current of 1C;

(B) the discharging is performed to 3V under a current of 1C;

(C) after the charging, the secondary battery is left to stand for 10 minutes, followed
by performing the discharging; and

(D) after the discharging, the secondary battery is left to stand for 10 minutes,
followed by performing the charging.

Claim 3 (Original): The nonaqueous electrolyte secondary battery according to claim 2, wherein said EC is contained in an amount of 20 to 50% by volume based on the total amount of said EC and said BL, and said BL is contained in an amount of 40 to 80% by volume based on the total amount of said EC and said BL.

Claim 4 (Currently Amended): A nonaqueous electrolyte secondary battery, comprising:

- a case having a wall thickness not larger than 0.3 mm;
- a positive electrode provided in said case;
- a negative electrode provided in said case; and
- a nonaqueous electrolyte which is provided in said case and comprises a nonaqueous solvent and a solute dissolved in said nonaqueous solvent, said nonaqueous solvent containing ethylene carbonate (EC), γ -butyrolactone (BL), and at least one ~~third solvent~~ selected from the group consisting of ethylene sulfite, phenylethylene carbonate, 2-methylfuran, furan, thiophene, catechol carbonate and vinylethylene carbonate as a third solvent, the EC content falling within a range of 20 to 50% by volume based on the total amount of the EC and the BL, and the BL content falling within a range of 40 to 80% by volume based on the total amount of the EC and the BL.

Claim 5 (Original): The nonaqueous electrolyte secondary battery according to claim 4, wherein said nonaqueous electrolyte is substantially in the form of a liquid or a gel.

Claim 6 (Currently Amended): The nonaqueous electrolyte secondary battery according to claim 4, wherein said ~~at least one third solvent~~ is contained in an amount of 5% by weight ~~of or~~ or less based on the total amount of said nonaqueous solvent.

Claim 7 (Original): The nonaqueous electrolyte secondary battery according to claim 4, wherein, when said ~~at least one~~ third solvent is formed of at least one solvent selected from the group consisting of phenylethylene carbonate, 2-methylfuran, furan, thiophene, catechol carbonate and vinyl ethylene carbonate, the mixing amount of said ~~at least one~~ third solvent is not larger than 3% by weight based on the total amount of said nonaqueous solvent.

Claim 8 (Currently Amended): The nonaqueous electrolyte secondary battery according to claim 4, wherein, when said ~~at least one~~ third solvent is formed of at least one solvent selected from the group consisting of 2-methylfuran, furan, thiophene, and catechol carbonate, the mixing amount of said ~~at least one~~ third solvent is not larger than 1.5% by weight based on the total amount of said nonaqueous solvent.

Claim 9 (Currently Amended): The nonaqueous electrolyte secondary battery according to claim 4, wherein, when ethylene sulfite is used as said ~~at least one~~ third solvent, the mixing amount of said ~~at least one~~ third solvent is not larger than 2% by weight based on the total amount of said nonaqueous solvent.

Claim 10 (Currently Amended): The nonaqueous electrolyte secondary battery according to claim 4, wherein said ~~at least one~~ third solvent is formed of at least one solvent selected from the group consisting of ethylene sulfite, phenylethylene carbonate, catechol carbonate and vinyl ethylene carbonate.

Claim 11 (Original): The nonaqueous electrolyte secondary battery according to claim 4, wherein said solute includes at least one lithium salt selected from the group consisting of LiClO_4 , LiPF_6 , LiBF_4 , LiAsF_6 , LiCF_3SO_3 , $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ and $\text{LiN}(\text{C}_2\text{F}_5\text{SO}_2)_2$.

Claim 12 (Original): The nonaqueous electrolyte secondary battery according to claim 4, wherein said negative electrode contains a carbonaceous material capable of absorbing-desorbing lithium ions.

Claim 13 (Original): The nonaqueous electrolyte secondary battery according to claim 12, wherein said carbonaceous material includes mesophase pitch based carbon fiber.

Claim 14 (Original): The nonaqueous electrolyte secondary battery according to claim 4, wherein said case is formed essentially of a metal plate, a metal film or a sheet including a resin layer.

Claim 15 (Currently Amended): A nonaqueous electrolyte secondary battery, comprising:

a case having a wall thickness not larger than 0.3 mm;

a positive electrode provided in said case;

a negative electrode provided in said case; and

a nonaqueous electrolyte layer which is arranged between said positive electrode and said negative electrode and comprises a nonaqueous electrolyte and a polymer for gelling said nonaqueous electrolyte, said nonaqueous electrolyte comprising a nonaqueous solvent containing ethylene carbonate (EC), γ -butyrolactone (BL), and at least one ~~third solvent~~ selected from the group consisting of ethylene sulfite, phenylethylene carbonate, 2-methylfuran, furan, thiophene, catechol carbonate and vinylethylene carbonate as a third solvent, the EC content falling within a range of 20 to 50% by volume based on the total amount of the EC and the BL, and the BL content falling within a range of 40 to 80% by volume based on the total amount of the EC and the BL.

Claim 16 (Original): The nonaqueous electrolyte secondary battery according to claim 15, wherein the mixing amount of said third solvent is not larger than 5% by weight based on the total amount of said nonaqueous solvent.

Claim 17 (Currently Amended): The nonaqueous electrolyte secondary battery according to claim 15, wherein, when said ~~at least one~~ third solvent is formed of at least one solvent selected from the group consisting of phenylethylene carbonate, 2-methylfuran, furan, thiophene, catechol carbonate and vinyl ethylene carbonate, the mixing amount of said ~~at least one~~ third solvent is not larger than 3% by weight based on the total amount of said nonaqueous solvent.

Claim 18 (Currently Amended): The nonaqueous electrolyte secondary battery according to claim 15, wherein, when said ~~at least one~~ third solvent is formed of at least one solvent selected from the group consisting of 2-methylfuran, furan, thiophene, and catechol carbonate, the mixing amount of said ~~at least one~~ third solvent is not larger than 1.5% by weight based on the total amount of said nonaqueous solvent.

Claim 19 (Currently Amended): The nonaqueous electrolyte secondary battery according to claim 15, wherein, when ethylene sulfite is used as said ~~at least one~~ third solvent, the mixing amount of said ~~at least one~~ third solvent is not larger than 2% by weight based on the total amount of said nonaqueous solvent.

Claim 20 (Currently Amended): The nonaqueous electrolyte secondary battery according to claim 15, wherein said ~~at least one~~ third solvent is formed of at least one solvent selected from the group consisting of ethylene sulfite, catechol carbonate, vinylethylene carbonate and phenylethylene carbonate.

Claim 21 (New): The nonaqueous secondary battery according to claim 4, wherein the content of said third solvent in the nonaqueous solvent falls within the range of 0.01% by weight to 5% by weight.

Claim 22 (New): The nonaqueous electrolyte according to claim 1, wherein said third solvent is formed of at least one solvent selected from the group consisting of ethylene sulfite, phenylethylene carbonate, catechol carbonate and vinylethylene carbonate.

Claim 23 (New): The nonaqueous electrolyte according to claim 1, wherein the content of said third solvent in the nonaqueous solvent is not more than 5% by weight.

Claim 24 (New): The nonaqueous electrolyte according to claim 1, wherein the content of said third solvent in the nonaqueous solvent falls within the range of 0.01% by weight to 5% by weight.